# THE FORM OF *NOMADA FULVICORNIS* F. (HYMENOPTERA APIDAE) ASSOCIATED WITH THE MINING BEE *ANDRENA NIGROSPINA* THOMSON

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## ABSTRACT

A distinctive form of *Nomada fulvicornis* Fabricius has been discovered within the British bee fauna. It is a special cleptoparasite of the mining bee *Andrena nigrospina* Thomson and shares with its host a univoltine life cycle that peaks in May and June. This form of *N. fulvicornis* appears to be genetically isolated from other forms of *N. fulvicornis*. It is therefore recommended that this form is referred to as subspecies *subcornuta* Kirby and the remaining forms associated with *Andrena bimaculata* (Kirby), *A. tibialis* (Kirby) and possibly *A. pilipes* Fabricius are retained within the existing subspecies *fulvicornis* pending further investigations. The brood dimorphism associated with bivoltine populations of *N. fulvicornis* is also described.

## INTRODUCTION

Within Britain, *Nomada fulvicornis* Fabricius is traditionally regarded as a scarce, rather variable species known to be a cleptoparasite of various *Andrena* species of the subgenus *Plastandrena*, (*A. bimaculata* (Kirby), *A. tibialis* (Kirby) and *A. pilipes* (Fabricius)). Recently, Baker (1994) demonstrated that British *A. pilipes* actually consists of two very similar species, *A. nigrospina* Thomson and *A. spectabilis* (Smith) (the latter now regarded as the true *A. pilipes* according to G. R. Else, pers. comm.), which are only confidently separable in the male sex. In Britain at least, *A. nigrospina* is strictly univoltine, flying from May to July, with records mostly for inland heathland sites as far north as the Midlands. By contrast, *A. pilipes* is bivoltine with spring and late summer broods (as in *A. bimaculata*) and a mainly coastal distribution. Kirby (1802) interpreted British *N. fulvicornis* as comprising four species: *N. lineola* Panzer and three species he described as new, *capreae*, *cornigera* and *subcornuta*. Despite the variation within the material supporting these names, they were all synonymysed within *N. lineola* by Yarrow (1970) and are considered to be synonyms of *Nomada fulvicornis fulvicornis* by Alexander and Schwarz (1994) in their world catalogue of *Nomada* (which recognises five subspecies of *N. fulvicornis*).

## THE HIGHGATE COMMON POPULATIONS OF *NOMADA FULVICORNIS*

At Highgate Common, Staffordshire (SO938899) a strong population of *A. nigrospina* is present (one of only a small number of modern populations currently known in Britain), and also the bivoltine *A. bimaculata*. Both species support populations of a nomad bee that key out as *Nomada fulvicornis*, but these are far from identical in terms of appearance and ecology, and appear to be acting as two distinct species. Females of the form associated with *A. bimaculata* (the '*bimaculata* form') are relatively small and gracile (wing length typically 8.5mm) with a relatively large tubercle on the labrum (Fig. 1d). Tergite 1 bears a pair of yellow markings, which may be fused in the middle and are typically fringed with red and the yellow spots of tergites 2 and 3 are relatively narrowly separated (Fig. 1e). This form is bivoltine with a flight period that parallels that of *A. bimaculata*, i.e. it usually

appears in early April, slightly later than its host, and persists to late May, which is a little later than the host. It then re-appears in mid July, persisting well into August. But in late May, when individuals of the *bimaculata* form are worn and disappearing, and long before the second generation of the *bimaculata* form appears, a significantly larger form (female wing length typically 10mm) associated with *A. nigrospina* (the '*nigrospina* form'), appears. The female always bears a pair of large, deep red spots on tergite 1 and more widely separated spots on tergites 2 and 3 (Fig. 1b). The tubercle of the labrum is relatively small (Fig. 1a), and there are a number of further differences, described in more detail in Table 1. Males of the two forms are less distinct, though the *nigrospina* form has the yellow markings on tergites 2 and 3 more widely separated (Fig. 1c versus Fig. 1f). Individuals of the *nigrospina* form are worn and dying off by the time the second generation of the *bimaculata* form appears. The *bimaculata* form exhibits a little brood dimorphism relating to length of pilosity of the thorax and legs in particular, and the extent of pale markings on the head and thorax. This is also described in Table 1. The two forms of *N. fulvicornis* are shown in Plate 15, fig. 2.

## Further examination of material and data

Following discovery of the above, the author made visits to the Natural History Museum, London (NHM) and Oxford University Museum (OUM), which both contain good series of *N. fulvicornis* from a variety of localities (including much foreign material at the NHM). The author has also obtained Sussex and Suffolk female material of *N. fulvicornis* that is seemingly associated with *A. tibialis,* and has corresponded with a number of key workers, including M. Schwarz in Austria, a world authority on *Nomada*. The following has been ascertained:

- The *nigrospina* form of *N. fulvicornis* has been historically recorded at scattered localities in the southern half of Britain, which often coincide with old *A. nigrospina* sites (based on material in collections). All dates indicate it is invariably univoltine with a flight period that matches that of *A. nigrospina*. The typical female appearance remains different to the remaining variation found within the *N. fulvicornis* complex.
- The bivoltine *bimaculata* form is much more frequent in Britain and exhibits some brood dimorphism, generally being more hirsute in the first generation with orange markings on the thorax and head more reduced than in the summer generation.
- Further variation of the bivoltine form of *N. fulvicornis* (with pale thoracic markings particularly extensive) may be linked to populations attacking *A. pilipes*, or perhaps *A. bimaculata* at particularly warm sites. Such variants tend to be from the southern part of the range.
- A further univoltine form of *N. fulvicornis* exists which attacks the univoltine *A. tibialis* in April and May and appears to be indistinguishable from the spring generation of the *bimaculata* form and clearly different to the univoltine *nigrospina* form. This is likely to be the form of *N. fulvicornis* recorded in northern England, as *A. tibialis* is the only potential host occurring north of the Midlands.
- The *N. fulvicornis* complex exhibits tremendous variation when viewed at an international level and already has 39 form or synonym names associated with it, currently arranged within five subspecies (Alexander & Schwarz, *loc. cit.*), which makes it difficult to rank and name the variation found in the British populations.

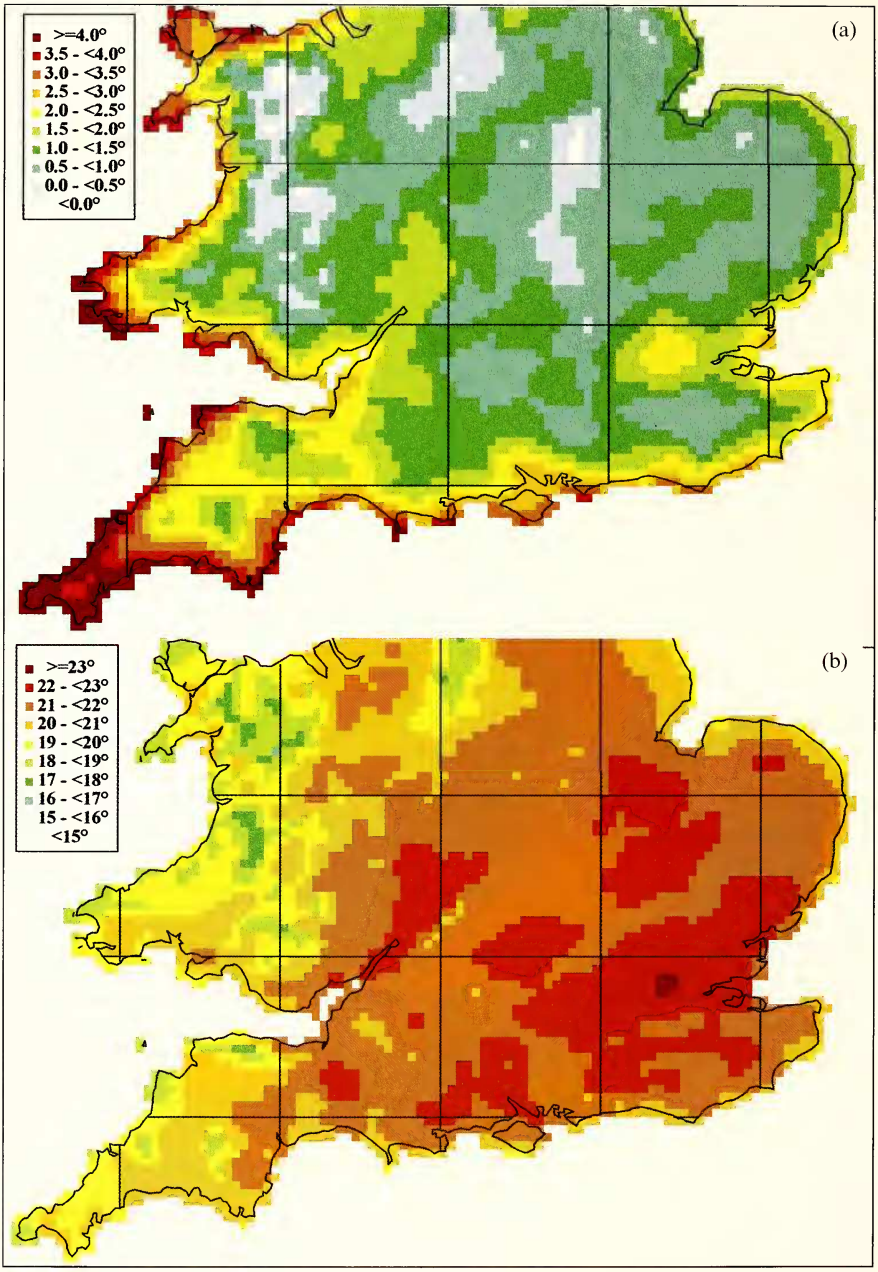


Fig. 6. Average minimum January (a) and maximum July (b) temperatures 1960–1990.

Plate 14

Fig. 2. The two *Nomada fulvicornis* races, top left – male of subspecies *subcornuta*, top right – female of same, bottom left – male of subspecies *fulvicornis*, bottom right – female of same.

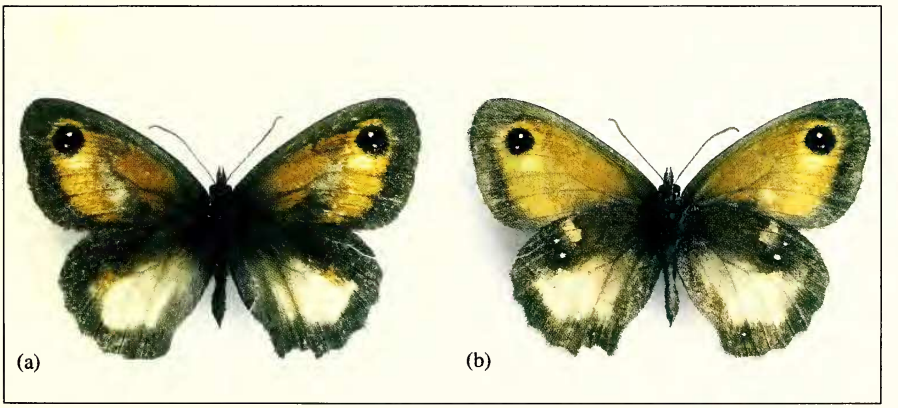


Fig. 1. (a) *Pyronia tithonus*, aberrant male upper side. Chilworth, South Hampshire, 2003. (b) Underside of *P. tithonus*. Photo: L. Winokur.

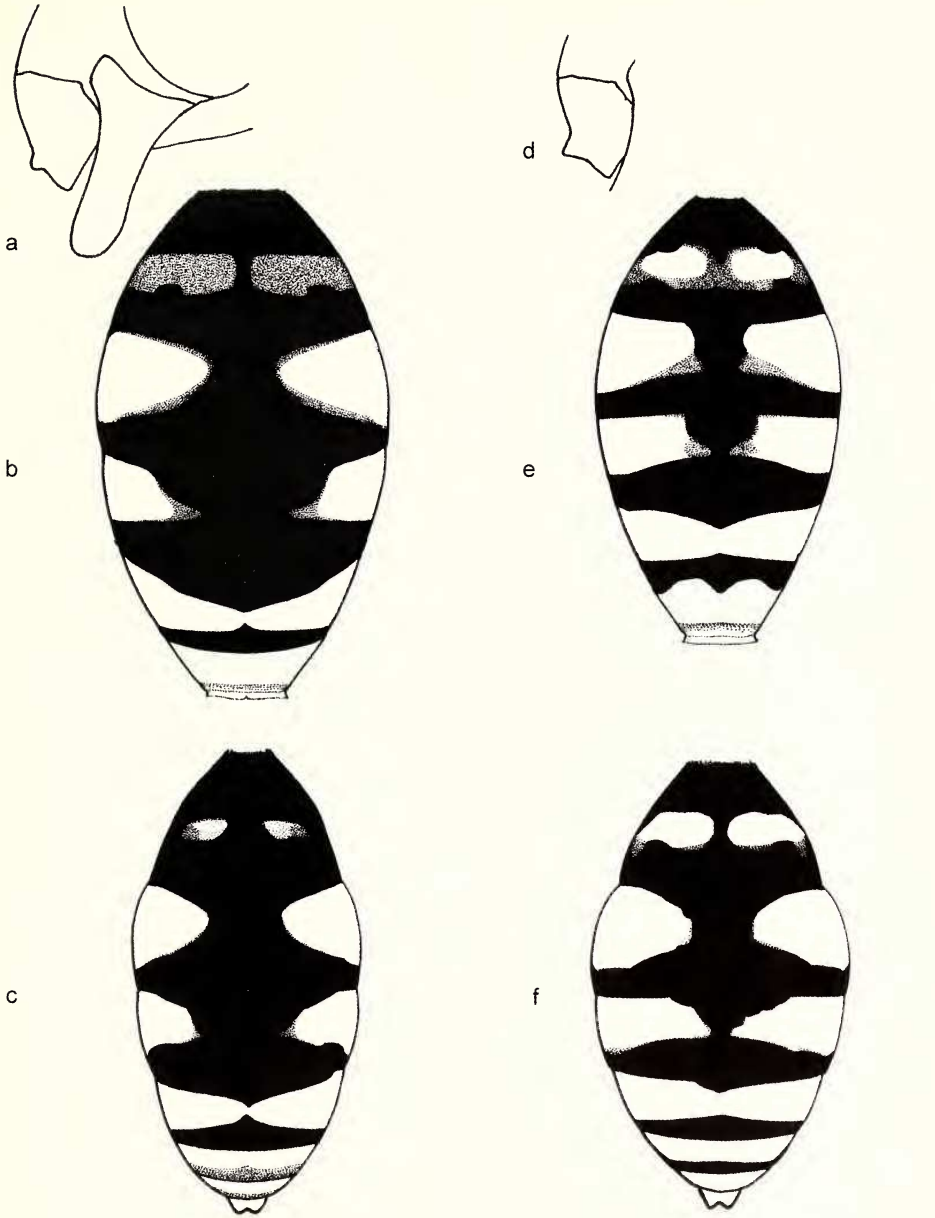


Fig. 1. Races of *Nomada fulvicornis* associated with *Andrena nigrospina* (a–c) and *A. bimaculata* (d–f). Race associated with *A. nigrospina* (subspecies *subcornuta*), (a) female lower face in profile showing small tubercle of labrum, (b) female abdomen showing extent of black, yellow and (stippled areas) red, and (c) male abdomen – ditto. Race associated with *A. bimaculata* (subspecies *fulvicornis*) showing (d) larger tubercle of female labrum and (e–f) more extensive yellow on the tergites of both sexes.